

SPAWAR



The Economics of PANDA

4301 Pacific Hwy, Building C-60 (CS)
San Diego, CA 92110
jwallace@spawar.navy.mil
VOICE - (619) 806-1097
FAX - (619) 537-0186

Jeffrey W. Wallace
Space and Naval Warfare Systems
Command
Technical Director for Modeling and
Simulation (PMW 131T)

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- **What is PANDA?**
 - **What Economic Issues?**
 - **Goals**
 - **How?**
 - **Development Components**
 - **Example**
 - **Conclusions**

WHAT???



- **What is PANDA?**
 - **Parallel Simulation Development Architecture**
 - **Just a name, we're having fun:-)**
 - **Following the Army's investment in the Integrated Simulation Language Environment (ISLE) project...**
 - **Which followed the Army's MODSIM project...**
 - **Which followed the Army's SIMSCRIPT project**
- **No funding, since no one thinks it can be done, and some think shouldn't be done**

What Economic Issues?



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- **The scarcity of hardcore computer science talent**
 - **The scarcity of money**

Goals



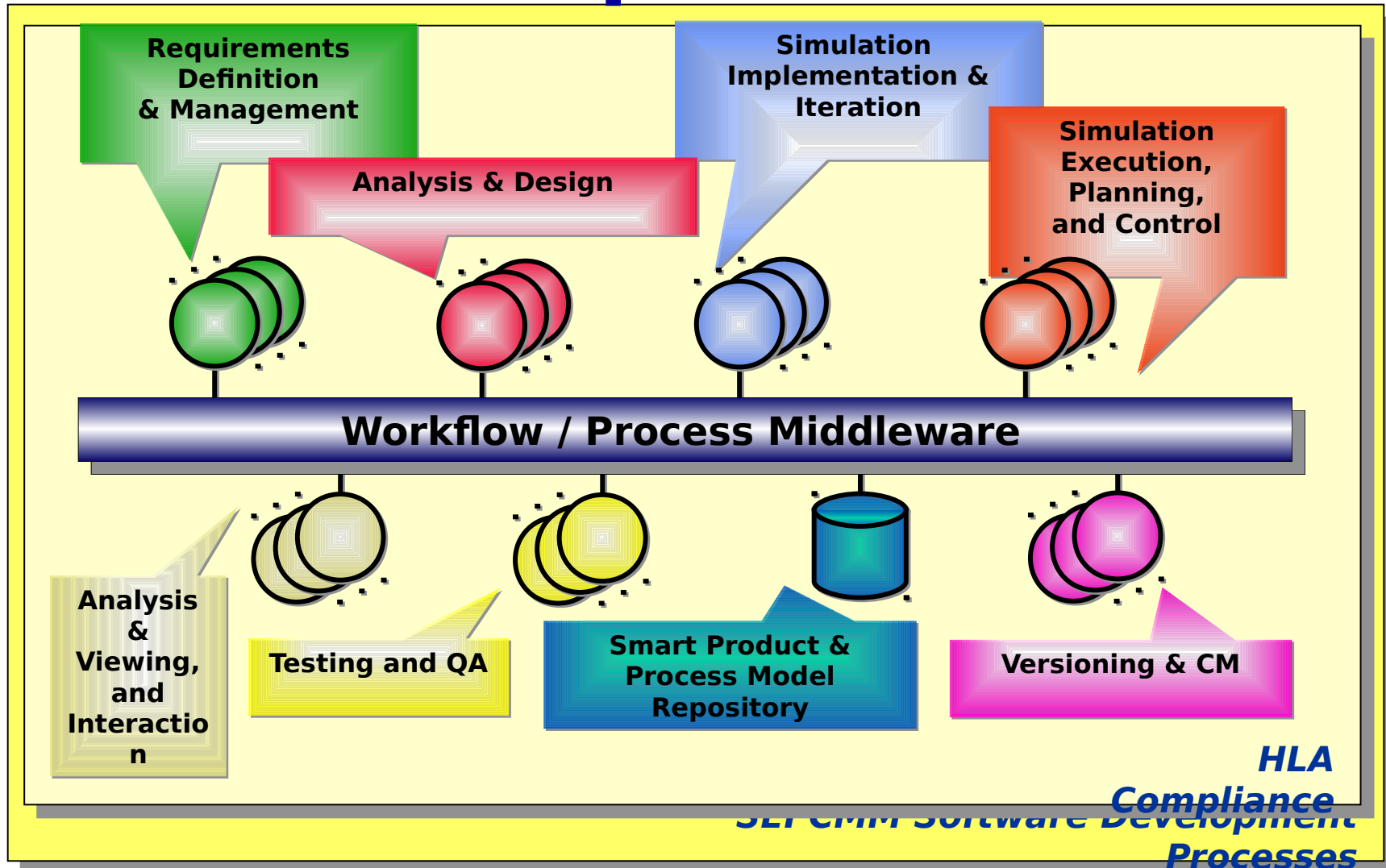
- **Optimal use of human capital**
 - **More mid-level than upper-level talent**
- **Reduce time to market**
 - **Time is money, generally speaking**

How?



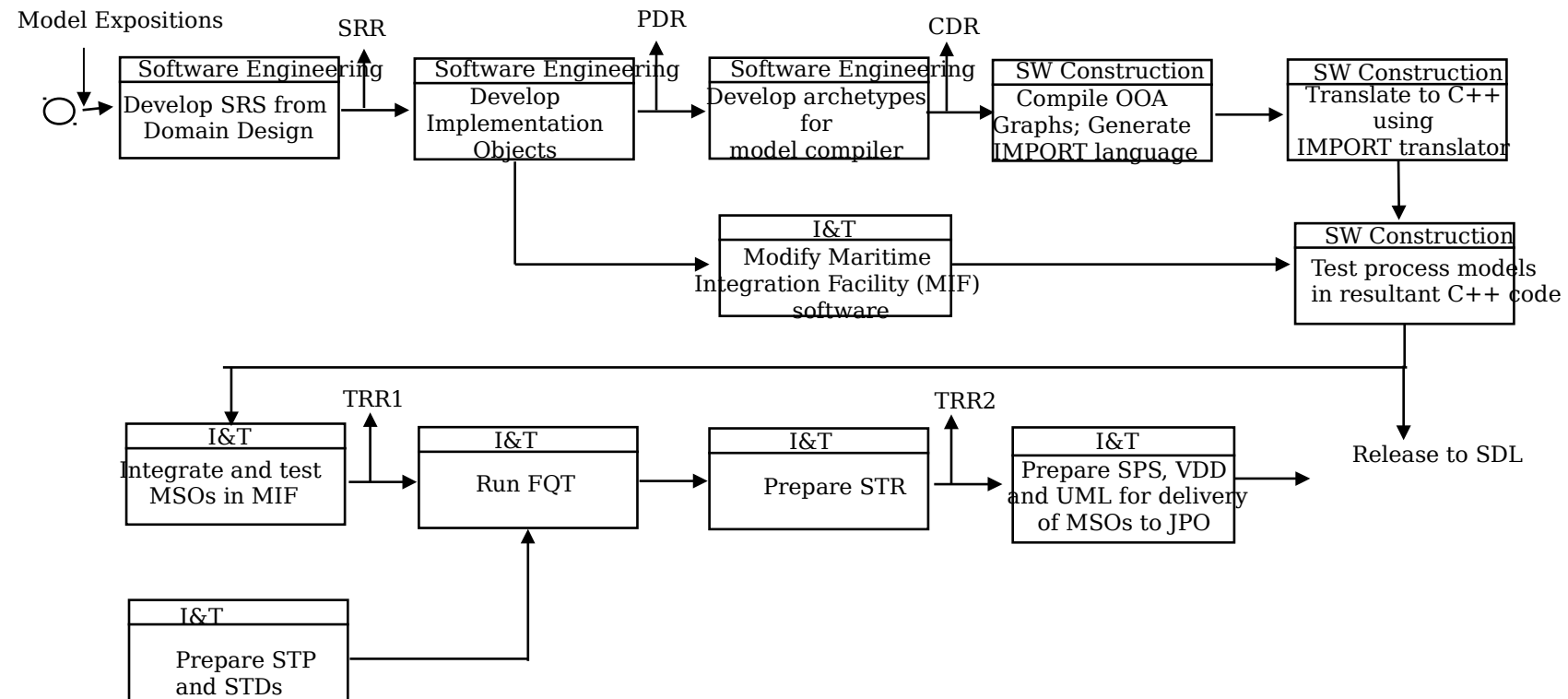
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- **Process automation**
 - **Scalable Processes**
 - **Software Development Tool Interoperability**
 - **Integrated Education and Training of the Human Capital**

Sampling of Development Components



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- **PMW 131 Development Process**
 - **JSIMS Maritime Software Engineering and Construction Tools**

Software Engineering, Construction, Integration and Test



Notes:

IMPORT = Integrated Persistent Object Relations Technology

MSO = Mission Space Object

Efforts can occur in parallel; this diagram addresses data required before a phase can be completed.

SRS = Software Requirements Specification

SRR = Software Requirements Review

PDR = Preliminary Design Review

CDR = Critical Design Review

TRR1 = Test Readiness Review

TRR2 = Test Report Review

SPS = Software product Specification

VDD = Version Description Document

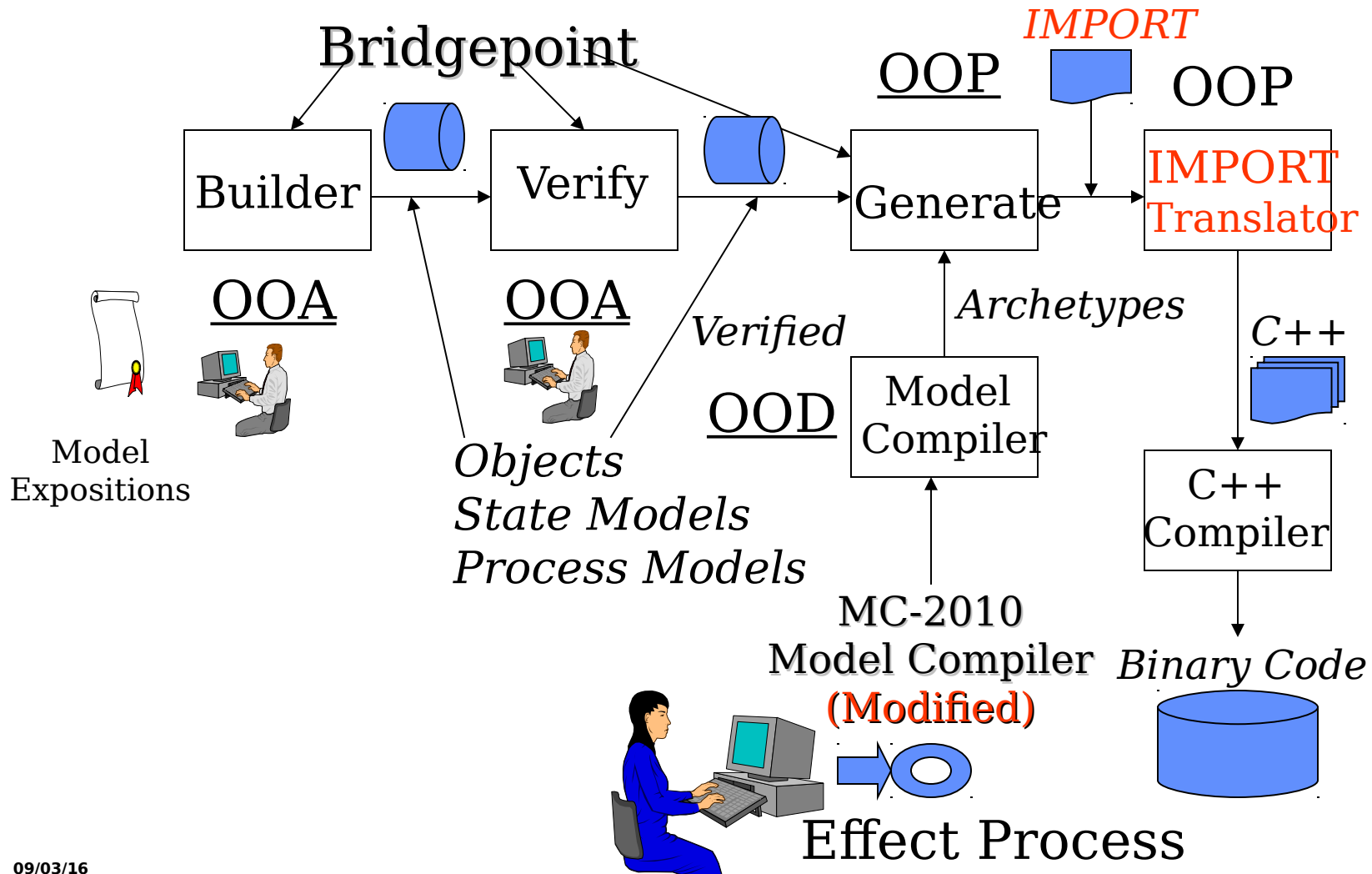
STP = Software Test Plan

STD = Software Test Descriptions

STR = Software Test Report

FQT = Formal Qualification Test

SDL = Software Development Library



Objectives



- **Productivity**
- **Flexibility**
- **Maintainability**

- **Bridgepoint CASE Tool (PTI License)**
- **Model Compiler; modified (PTI procured)**
- **IMPORT Language Translator (GOTS)**
- **C++ Compilers (COTS)**

- **Allows analyst to build:**
 - **Objects**
 - **State models**
 - **Process Models**
- **Specify relationships**

- **Checks Models**
- **Uses events**
- **Prior to “coding”**
- **Detects erroneous behavior**

Role of Generator



- **Builds language constructs**
- **Uses analysis models**
- **Uses model compiler**

- **Contains archetypes**
- **Provides directives to generator**
- **Captures design decisions**
- **Example: JMASS 98 API compliant models could easily be generated from the MC-2010 as opposed to the JSIMS High Level Design (HLD)**

Role of IMPORT Translator



- **Uses output of generator**
- **Produces C++ code**
- **Provides from libraries**
 - **Event handler**
 - **Time management**

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- **Port Base Class Library (IMPORT)**
 - **Port Base Class Archetypes (IMPORT)**
 - **Develop Action Language Translator**
 - **Develop persistence service for IMPORT**

Sample Users of Modified Model Compiler Technology



- **Tel Labs - China**
- **Motorola - Chicago**
- **Tate Electronics - New Zealand**
- **Kenwood - Japan**
- **Canon - Japan**
- **EDF - France**

Conclusions



- **Enough of this theory works to make the leap of faith that the concept will work completely**
 - **Same development front end tool generating different execution infrastructures**
 - **Working on different front ends generating same execution infrastructure**
 - **Some tool interoperability**
 - **Some tool interchangeability**
 - **Vast improvement in productivity**
 - **Very flexible**